

AMENDMENTS TO THE CLAIMS

Claim 1 (previously presented) A method of remotely manipulating vehicle elements in a vehicle, comprising:

coupling among a plurality of network elements including at least one vehicle internetwork, at least one gateway node of the vehicle, and the Internet, wherein the gateway node in the vehicle comprises at least one real-time interface processor (RTIP) and at least one application processor, the RTIP performing real-time operations and the application processor performing high-level processing functions, wherein the RTIP couples the application processor to a vehicle bus and to an external network;

providing at least one of data processing, data storage, access control, protocol translation, security including service discovery and device authentication, and network control using the gateway node;

automatically providing secure interoperability among the plurality of network elements in response to node information including configuration and security information; and

remotely manipulating at least one function of the vehicle elements and controlling remote access to the vehicle internetwork using the gateway node of the vehicle in response to intermittent external communications.

Claim 2 (previously presented) The method of claim 1, further comprising hosting the at least one vehicle internetwork on at least one of automobiles, trucks, aircraft, trains, motorcycles, and marine vessels.

Claim 3 (previously presented) The method of claim 1, further comprising coupling the at least one gateway node of the vehicle to a remote user computer.

Claim 4 (original) The method of claim 1, wherein the at least one function includes vehicle control functions, security functions, diagnostic functions, and network access functions.

Claim 5 (original) The method of claim 1, further comprising establishing communication among the at least one node of a plurality of host vehicles.

Claim 6 (original) The method of claim 1, further comprising supporting data transfer and manipulation among the plurality of network elements using at least one coupling among the at least one vehicle internetwork and at least one external network, wherein the data includes vehicle assembly data, service data, diagnostic data, maintenance data, maintenance history data, security data, vehicle position data, vehicle operations profile data, operator profile data, fleet management data, fleet reliability analysis data, electronic mail, entertainment software, and targeted advertising data.

Claim 7 (original) The method of claim 1, further comprising:

receiving a first type of data from the at least one vehicle internetwork;

performing diagnostic and prognostic analysis on the first type of data;

transmitting a second type of data to the at least one vehicle internetwork in response to the diagnostic and prognostic analysis.

Claim 8 (original) The method of claim 1, further comprising reprogramming at least one element of the at least one vehicle internetwork using at least one Internet coupling.

Claim 9 (original) The method of claim 1, further comprising reconfiguring at least one element of the at least one vehicle internetwork using at least one Internet coupling.

Claim 10 (previously presented) The method of claim 1, wherein the at least one vehicle internetwork comprises at least one peripheral electronic device, wherein the at least one peripheral electronic device includes at least one of climate control devices, actuator devices, position location devices, Global Positioning System (GPS) devices, communication devices,

cellular telephony devices, personal digital assistants (PDAs), processing devices, diagnostic devices, modems, pager devices, video devices, audio devices, multimedia devices, electronic game devices, sensor devices, switch devices, anti-theft devices, device subnetworks, and wireless local area network (LAN) devices.

Claim 11 (original) The method of claim 1, further comprising supporting atomic transactions among the plurality of network elements.

Claim 12 (original) The method of claim 1, further comprising manipulating the node information including configuration and security information to provide secure interoperability among the plurality of network elements and at least one peripheral electronic device.

Claim 13 (previously presented) The method of claim 1, wherein the at least one vehicle internetwork comprises at least one local area network that includes at least one of an Original Equipment Manufacturer (OEM) bus, at least one Automotive Multimedia Interface Consortium (AMI-C) bus, at least one external network, at least one local development network, and at least one legacy automotive bus including at least one of Audio Control Protocol (ACP) buses and Standard Corporate Protocol (SCP) buses.

Claim 14 (previously presented) The method of claim 1, further comprising:

accessing the plurality of network elements using at least one local development network;
and

performing application upgrades, diagnostics, and programming, wherein the at least one local development network supports manipulation and transfer of entertainment software, wherein the entertainment software comprises at least one of video, audio, movies, television shows, music, games, and simulations.

Claim 15 (previously presented) The method of claim 1, wherein the at least one vehicle internetwork comprises at least one interface port including at least one of Intelligent Data Bus (IDB-C) ports, MOST ports, Institute of Electrical and Electronics Engineers (IEEE) 1394 ports,

On-Board Diagnostic-II (OBD-II) ports, Standard Corporate Protocol (SCP) ports, Audio Control Protocol (ACP) ports, Bluetooth ports, Personal Communications Service (PCS) ports, Global System for Mobile Communications (GSM) ports, and local area network ports.

Claim 16 (previously presented) The method of claim 1, wherein providing secure interoperability further includes distributing at least one function among the plurality of network elements in response to a coupling of peripheral electronic devices to at least one local area network of the at least one vehicle internetwork.

Claims 17 and 18 (Canceled)

Claim 19 (previously presented) The method of claim 1, wherein the at least one vehicle internetwork comprises at least one port node including at least one of at least one processor, at least one memory cache, at least one wireless modem, at least one network protocol, at least one policy, and at least one wired local area network (LAN).

Claim 20 (previously presented) The method of claim 1, further comprising coupling the at least one vehicle internetwork to at least one subnetwork, wherein the at least one subnetwork comprises at least one device that is at least one of sensor devices, actuator devices, wired network devices, and wireless network devices.

Claim 21 (previously presented) The method of claim 1, wherein the at least one vehicle internetwork generates at least one hierarchy of communication alternatives in response to a determined position of a host vehicle, wherein a selected communication device is used to communicate with the at least one other site.

Claim 22 (previously presented) The method of claim 1, further comprising controlling data processing using at least one processing hierarchy that controls at least one of data classifications, data transfers, data queuing, data combining, processing locations, and communications among the plurality of network elements.

Claim 23 (previously presented) The method of claim 1, further comprising distributing at least one function among the plurality of network elements, wherein the at least one function includes at least one of data acquisition, data processing, communication management, data routing, data security, programming, node operation, protocol translation, network management, and interfacing with at least one communication physical layer including cellular telephony, wireline telephone, satellite telephony, packet radio, microwave, optical.

Claim 24 (original) The method of claim 1, further comprising distributing data processing functions of at least one component of the at least one vehicle internetwork among a plurality of processors.

Claim 25 (original) The method of claim 1, further comprising automatically organizing the plurality of network elements, wherein the automatic organizing comprises automatically controlling data transfer, processing, and storage among the plurality of network elements.

Claim 26 (original) The method of claim 1, further comprising supporting at least one level of synchronization among different subsets of the plurality of network elements, wherein a first level of synchronization is supported among a first subset of the plurality of network elements, wherein a second level of synchronization is supported among a second subset of the plurality of network elements.

Claim 27 (original) The method of claim 1, further comprising self-assembling the plurality of network elements, wherein search and acquisition modes of the plurality of network elements search for participating ones of the plurality of network elements, wherein a determination is made whether each of the participating ones of the plurality of network elements are permitted to join the vehicle internetwork using a message hierarchy, wherein the plurality of network elements are surveyed at random intervals for new nodes and missing nodes.

Claim 28 (previously presented) The method of claim 1, wherein service discovery comprises synchronizing at least one node, authenticating the at least one node, determining at least one

communication mode for the at least one node, informing the at least one node of resources available among the plurality of network elements.

Claim 29 (previously presented) The method of claim 1, further comprising collecting data among the plurality of network elements, wherein at least one operation is performed on the data in response to parameters established by a user, the at least one operation being at least one of classification, routing, processing, storing, and fusing.

Claim 30 (original) The method of claim 29, wherein routing comprises selecting at least one data type for routing, determining at least one communication type and at least one communication coupling for routing, selecting at least one of the plurality of network elements to which to route the selected data, selecting at least one route to the selected at least one of the plurality of network elements, and routing the selected at least one data type to the selected at least one of the plurality of network elements.

Claim 31 (original) The method of claim 29, wherein processing comprises selecting at least one data type for processing, selecting at least one processing type, selecting at least one of the plurality of network elements to perform the selected at least one processing type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route.

Claim 32 (original) The method of claim 29, wherein storing comprises selecting at least one data type for storage, selecting at least one storage type, selecting at least one of the plurality of network elements to perform the selected at least one storage type, and transferring the selected at least one data type to the selected at least one of the plurality of network elements using at least one route through the plurality of network elements.

Claim 33 (original) The method of claim 29, wherein fusing comprises a first node transmitting at least one query request to at least one other node, wherein the first node collects data from the at least one other node in response to the at least one query request, and processes the collected data.

Claim 34 (original) The method of claim 1, wherein the plurality of network elements comprise a plurality of application programming interfaces (APIs), wherein the APIs include APIs for application support, database services, routing, security, network management, and deployment.

Claim 35 (original) The method of claim 34, wherein the plurality of APIs are layered, wherein the plurality of APIs enable distributed resource management by providing network resource information among the plurality of network elements, wherein information transfer among the plurality of network elements is controlled using a synchronism hierarchy established in response to the network resource information.

Claim 36 (previously presented) The method of claim 1, further comprising supporting at least one of wireless communications, wired communications, and hybrid wired and wireless communications.

Claim 37 (previously presented) The method of claim 1, further comprising coupling the at least one vehicle internetwork to at least one remote computer through the plurality of network elements, wherein the plurality of network elements further includes at least one of at least one station gateway, at least one server, at least one repeater, at least one interrogator, and at least one network, wherein the at least one network includes wired networks, wireless networks, and hybrid wired and wireless networks.

Claim 38 (previously presented) The method of claim 1, wherein the remote manipulation is performed using World Wide Web-based tools to manipulate data, code, control, and security functions.

Claim 39 (original) The method of claim 1, wherein the plurality of network elements comprise a plurality of node types, wherein the plurality of node types includes at least one node of a first type and at least one node of a second type, wherein a first network having a first node density is assembled using the at least one node of a first type, wherein a second network having a second node density is assembled using the at least one node of a second type.

Claim 40 (previously presented) The method of claim 1, further comprising transferring software and data among the plurality of network elements, wherein the transfer is remotely controllable, wherein the software and the data are downloadable from at least one of storage devices of the plurality of network elements, external storage devices, and remote storage devices.

Claim 41 (original) The method of claim 1, further comprising:

coupling the at least one vehicle internetwork to at least one diagnostic device;

collecting vehicle data using the at least one diagnostic device; and

transferring the vehicle data to at least one remote computer using at least one wireless coupling.

Claim 42 (previously presented) A computer readable medium containing executable instructions which, when executed in a processing system, cause the processing system to remotely manipulate vehicle elements in a vehicle by:

coupling among a plurality of network elements including at least one vehicle internetwork, at least one gateway node of the vehicle, and the Internet, wherein the gateway node of the vehicle comprises at least one real-time interface processor (RTIP) and at least one application processor, the RTIP performing real-time operations and the application processor performing high-level processing functions, wherein the RTIP couples the application processor to a vehicle bus and to an external network;

providing at least one of data processing, data storage, access control, protocol translation, security including service discovery and device authentication, and network control using the gateway node;

automatically providing secure interoperability among the plurality of network elements in response to node information including configuration and security information; and

remotely manipulating at least one function of the vehicle elements and controlling remote access to the vehicle internetwork using the gateway node in response to intermittent external communications.

Claim 43 (previously presented) The computer readable medium of claim 42, wherein the processing system further manipulates vehicle elements by hosting the at least one vehicle internetwork on at least one of automobiles, trucks, aircraft, trains, and motorcycles.

Claim 44 (previously presented) The computer readable medium of claim 42, wherein the processing system further manipulates vehicle elements by coupling the at least one gateway node of the vehicle to a remote user computer.

Claim 45 (original) The computer readable medium of claim 42, wherein the at least one function includes vehicle control functions, security functions, diagnostic functions, and network access functions.

Claim 46 (original) The computer readable medium of claim 42, wherein the processing system further manipulates vehicle elements by establishing communication among the at least one node of a plurality of host vehicles.

Claim 47 (original) The computer readable medium of claim 42, wherein the processing system further manipulates vehicle elements by supporting data transfer and manipulation among the plurality of network elements using at least one coupling among the at least one vehicle internetwork and at least one external network, wherein the data includes vehicle assembly data, service data, diagnostic data, maintenance data, maintenance history data, security data, vehicle position data, vehicle operations profile data, operator profile data, fleet management data, fleet reliability analysis data, electronic mail, entertainment software, and targeted advertising data.

Claim 48 (previously presented) The computer readable medium of claim 42, wherein the processing system further manipulates vehicle elements by:

receiving a first type of data from the at least one vehicle internetwork;

performing diagnostic and prognostic analysis on the first type of data;

transmitting a second type of data to the at least one vehicle internetwork in response to the diagnostic and prognostic analysis.

Claim 49 (previously presented) An electromagnetic medium containing executable instructions which, when executed in a processing system, cause the processing system to remotely manipulate vehicle elements of a vehicle by:

coupling among a plurality of network elements including at least one vehicle internetwork, at least one gateway node of the vehicle, and the Internet, wherein the gateway node of the vehicle comprises at least one real-time interface processor (RTIP) and at least one application processor, the RTIP performing real-time operations and the application processor performing high-level processing functions;

providing at least one of data processing, data storage, access control, protocol translation, security including service discovery and device authentication, and network control using the gateway node;

automatically providing secure interoperability among the plurality of network elements in response to node information including configuration and security information; and

remotely manipulating at least one function of the vehicle elements and controlling remote access to the vehicle internetwork using the gateway node in response to intermittent external communications.

Claim 50 (previously presented) The electromagnetic medium of claim 49, wherein the processing system further manipulates vehicle elements by hosting the at least one vehicle internetwork on at least one of automobiles, trucks, aircraft, trains, motorcycles, and marine vessels.

Claim 51 (previously presented) The electromagnetic medium of claim 49, wherein the processing system further manipulates vehicle elements by coupling the at least one gateway node of the vehicle to a remote user computer.

Claim 52 (original) The electromagnetic medium of claim 49, wherein at least one function includes vehicle control functions, security functions, diagnostic functions, and network access functions.

Claim 53 (original) The electromagnetic medium of claim 49, wherein the processing system further manipulates vehicle elements by establishing communication among the at least one node of a plurality of host vehicles.

Claim 54 (original) The electromagnetic medium of claim 49, wherein the processing system further manipulates vehicle elements by supporting data transfer and manipulation among the plurality of network elements using at least one coupling among the at least one vehicle internetwork and at least one external network, wherein the data includes vehicle assembly data, service data, diagnostic data, maintenance data, maintenance history data, security data, vehicle position data, vehicle operations profile data, operator profile data, fleet management data, fleet reliability analysis data, electronic mail, entertainment software, and targeted advertising data.

Claim 55 (original) The electromagnetic medium of claim 49, wherein the processing system further manipulates vehicle elements by:

receiving a first type of data from the at least one vehicle internetwork;

performing diagnostic and prognostic analysis on the first type of data;

transmitting a second type of data to the at least one vehicle internetwork in response to the diagnostic and prognostic analysis.

Claim 56 (previously presented) A method of remotely manipulating vehicle elements in a vehicle, comprising:

coupling among a plurality of network elements including at least one vehicle internetwork, at least one gateway node of the vehicle, and the Internet, wherein the gateway node in the vehicle comprises at least one real-time interface processor (RTIP) and at least one application processor, the RTIP predominantly performing real-time operations and the application processor predominantly performing high-level processing functions, wherein the RTIP is coupled to provide information received from at least one of the vehicle elements to the application processor;

automatically providing interoperability among the plurality of network elements ; and

remotely manipulating at least one function of the vehicle elements.

Claim 57 (currently amended) A method of remotely manipulating vehicle elements in a vehicle, comprising:

coupling among a plurality of network elements including at least one vehicle internetwork, ~~at least one gateway node of the vehicle, and the Internet,~~ wherein the at least one vehicle internetwork comprises a plurality of nodes and at least one peripheral electronic device, and wherein each of the plurality of nodes comprises a real-time interface processor and an application processor, the real-time interface processor being coupled to provide at least a portion of the data received by the node to the application processor;

automatically providing secure interoperability among the plurality of nodes of the at least one vehicle internetwork and the at least one peripheral electronic device in response to node information including configuration and security information; and

remotely manipulating at least one function of the vehicle elements.

Claim 58 (previously presented) The method of claim 57, further comprising distributing data processing functions of at least one component of the at least one vehicle internetwork among a plurality of processors.

Claim 59 (previously presented) The method of claim 57, further comprising automatically organizing the plurality of network elements, wherein the automatic organizing comprises automatically controlling data transfer, processing, and storage among the plurality of network elements.

Claim 60 (previously presented) The method of claim 57, further comprising self-assembling the plurality of network elements, wherein search and acquisition modes of the plurality of network elements search for participating ones of the plurality of network elements, wherein a determination is made whether each of the participating ones of the plurality of network elements are permitted to join the vehicle internetwork.

Claim 61 (previously presented) The method of claim 56, wherein the at least one gateway node provides protocol translation in bridging a first vehicle bus and a second vehicle bus.

Claim 62 (previously presented) The method of claim 61, wherein the at least one gateway node functions as an Internet Protocol (IP) router, and wherein the RTIP comprises a high-speed bus controlled by at least one device coupled to the first vehicle bus.

Claim 63 (previously presented) The method of claim 56, wherein the at least one gateway node includes a wireless access port for local area networking.

Claim 64 (previously presented) The method of claim 56, wherein the RTIP couples the application processor to a vehicle bus and to an external network.